

The Economic Determinants of Military Expenditure in Selected East Asian Countries*

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This paper examines the economic determinants of defence spending in six East Asian countries: Indonesia, Malaysia, South Korea, Singapore, Thailand, and the Philippines. It is hypothesized that economic factors play an important role in determining military spending levels in these countries. Our results, which support the earlier work by Geoffrey Harris, suggest that economic variables and resource availability are probably the main determinants of military expenditures. Three basic patterns were found: stabilization, augmentation, and distributed lags. While all countries increased their defence budgets as expected GNP increased, a significant variation between countries existed as to the timing of the increased defence allocations. The variations were so large that specific a priori generalizations could not be made as to how economic constraints control the budgetary process in these countries.

Introduction

World military expenditures exceeded one trillion U.S. dollars for the very first time in 1987. While the developed countries' share increased to 83 per cent (from approximately 78 per cent in 1977) the developing countries' share declined to 5 per cent from 17 per cent.¹ As noted by the U.S. Arms Control and Disarmament Agency, this allocation of resources to defence represented more than 5 per cent of the world's aggregate product.²

Although annual growth in real military spending was zero for the world in 1987, the growth by developed countries (2.9 per cent between 1982 and 1987) was matched by a decline in developing countries. In fact, the decline in the growth of military spending has accelerated since 1984: from 2 per cent in 1985, to 5.8 per cent in 1986, to 9.1 per cent in 1987. Table 1 indicates the average annual real growth rate in defence spending by region for the developing countries.³

TABLE 1
Real Growth in Military Expenditures,
1982-87, by Region

Africa	-1.3%
East Asia	1.9
Latin America	-1.3
Middle East	-6.9
South Asia	6.9

SOURCE: United States Arms Control and Disarmament Agency (ACDA), *World Military Expenditures and Arms Transfers, 1988* (Washington, D.C.: U.S. Government Printing Office, 1989), p. 2

The large decline in Middle East defence spending reflects negative growth rates in 13 of the 16 Middle East countries between 1984 and 1987. The large increase in South Asia reflects large increases in defence outlays by Pakistan and India.

Military spending patterns in the East Asian region show wide variability. Table 2 indicates the 1987 military burden (military expenditures [MILEXP] as a percentage of GNP) and military expenditures as a percentage of central government expenditures (CGE) for selected East Asian countries.⁴

Prompted mainly by economists, there has been a growing interest in the economics of defence in developing nations since the late 1970s. Since the early studies by scholars such as Rothschild in 1977⁵ and by Benoit in 1973⁶, much of the research has focused on how military spending affects growth: does it hinder, help, or have a neutral effect on growth?⁷ In the last several years, other researchers have questioned the direction of causality — that is, does defence “cause” growth or does growth allow developing countries the luxury of spending more on defence programmes?⁸

TABLE 2
 Military Expenditures as a Percentage of GNP and CGE,
 Selected East Asian Countries, 1987^a

	MILEXP/GNP	MILEXP/CGE
Burma	3.0%	20.9% ^b
Taiwan	4.6	41.5
Indonesia	2.1	8.6
S. Korea	4.8	25.5
Malaysia	3.2	9.7
Philippines	1.3	7.8
Singapore	5.5	15.1*
Thailand	3.7	18.3

^aCambodia, Laos, and Vietnam excluded for lack of data

^b1986

SOURCE: United States Arms Control and Disarmament Agency,
World Military Expenditures and Arms Control, 1988
 (Washington, D.C.: U.S. Government Printing Office,
 1989).

Despite this effort, relatively little attention has been directed at investigating the determinants of defence spending especially in developing countries. As recently noted by Deger and West:

The decisions respecting military expenditures and arms imports were generally viewed as being governed by exogenous factors, outside the considerations bearing on allocation of public resources for development and civilian government services, and presented as a kind of budgetary 'Hobson's choice'. The conventional wisdom about the relation of military expenditure to economic performance derived from a very limited, almost casual, base of empirical observation.⁹

As noted below, while most of the literature which pertains to the determinants of defence has been aimed at the developed countries, there have been several studies which looked at the relationship for developing countries.¹⁰ However, as Deger and West noted:

There is ... little evidence as yet of a consensus with respect to the appropriate weighting of factors in an explanation of the allocation of resources to national defense or in a generally-applicable model of the interactions between security and economic performance.¹¹

The purpose of this paper is to extend the discussion on the economic determinants of defence spending in developing countries. Time

series data for six East Asian countries are examined here: Indonesia, Malaysia, South Korea, Singapore, Thailand, and the Philippines. It is hypothesized that economic factors have played a significant role in determining military spending in these six countries. Furthermore, it is expected that the particular explanatory model will vary from country to country. If economic factors are found to be an important determinant of military expenditures, then any attempt to forecast future defence budgets without considering the economic aspects is likely to be incorrect.

Review of the Literature

As noted above, much of the literature has dealt with developed countries. For example, Griffin, Wallace, and Devine examined defence spending patterns in the United States between 1949 and 1976 and concluded that "military outlays [as a percentage of GNP] do appear to be employed as a counter-cyclical fiscal instrument by the state".¹²

For the case of Canada, Treddenick attempted to:

pursue one particular line of thinking about military expenditures: namely, that the level and composition of a nation's military expenditures may be significantly influenced by domestic economic imperatives which are independent of any security considerations. Thus, military expenditures may be undertaken to promote economic objectives but rationalized in terms of providing for national security.¹³

Treddenick concluded that "large increases in Canadian defence expenditures have been influenced more by economic than security considerations".¹⁴

Hill employed a sample of both developed and developing nations in his attempt to synthesize the various approaches used to examine the determinants of defence spending.¹⁵ Hill was unable to find one "over-riding" factor which could explain the variance in defence spending patterns among the sample set. This led him to conclude that "the military spending level of any nation is likely to be a product of a number of separate forces",¹⁶ which include arms races, military alliances, status and rank discrepancies in international systems, military aid, size and wealth of the country, the form of government, the extent of military involvement, internal social divisiveness, and internal political conflict.

Arthur Westing in 1978 sought "to present some critical reflections that might prove useful to those concerned with military expenditures and proposals for their reductions".¹⁷ Using data for 159 countries, military expenditures were, in turn, regressed on population, land area (total and productive), and wealth (as proxied by GNP). He concluded that:

The basic analyses . . . revealed the existence of a moderately close correlation between military expenditures and GNP ($r^2 = 0.777$), but very little correlation with population ($r^2 = 0.193$). The correlation with total land area was quite good ($r^2 = 0.647$) and that with productive land area somewhat better ($r^2 = 0.736$).¹⁸

Westing repeated his analysis for 27 wealthy nations (nations with a GNP per capita that was double the combined GNP per capita of all the 159 countries) and found that military expenditures were closely correlated with population and productive land area.

In an important paper which related defence spending to economic variables, Ames and Goff examined defence and education expenditures in sixteen South American countries for the twenty-year period between 1948 and 1968.¹⁹ They found that political variables were not the major determinants of either education or defence budgets; instead, they concluded that changes in the education and defence budgets were related to the level of available resources.

O'Leary and Coplin suggested that the following factors might influence defence spending patterns in Latin America:

- economic condition of the country;
- role of the military in non-military affairs;
- internal security needs;
- arms races;
- military budgets in rival states;
- internal political support;
- age structure of existing equipment.²⁰

The only apparent correlation was between the military budget and arms races and the budget levels in rival states. Apparently, both of these factors acted as a "reference point" from which individual countries might set their own budget levels.

More recently, Maizels and Nissanke attempted to quantify the major factors which have influenced military spending in 83 countries.²¹ They developed a conceptual matrix which distinguished between domestic, regional, and global conflicts on the one hand, and three potential influences on military expenditures (political framework, economic linkages, and military activity) on the other. They attempted to apply this conceptual model using cross-country regressions for the sample as a whole, and for separate regions of Africa, Asia, and Latin America. They concluded:

The differences among developing countries in the relative size of their military burdens . . . appear to reflect a complex of factors — domestic, regional, and global — which are not easy to disentangle, and which no doubt vary in emphasis from country to country . . . Domestic

factors, particularly the need perceived by ruling élites to repress internal opposition groups, and external factors, including relations with the global power blocs and the availability of foreign exchange to purchase arms from abroad, also appear to be major determinants of government decisions in regard to military expenditures.²²

In 1986, Harris attempted to measure the effect of domestic economic conditions since the early 1960s on military budgets in five ASEAN countries: Indonesia, Malaysia, Philippines, Singapore, and Thailand.²³ His main findings were:

1. Defence expenditures in the current year are positively correlated with both defence spending and the central budgetary position in the previous year.
2. Current defence expenditures have a weak inverse correlation with inflation in the previous year.
3. Although current defence budgets are not correlated with the balance of payments in the previous year, the balance of payments affects government revenue which in turn affects defence spending.²⁴

David Denoon offered five theoretical explanations for recent patterns of defence expenditures in certain ASEAN countries.²⁵ These are:

1. Governments respond to actual military threats;
2. Domestic political concerns determine recruiting, the stationing of troops and levels of readiness;
3. Resources allocated to defence are determined through the government system;
4. Military-industrial complexes vie for shares of the defence budget;
5. Arms races affect military budgets.²⁶

In an extension of the Harris paper, Looney and Frederiksen used time series data to examine the economic determinants of defence expenditures for ten Latin American countries: Argentina, Peru, Mexico, Venezuela, Chile, Paraguay, Uruguay, Colombia, Brazil, and Ecuador.²⁷ Four alternative models were tested. The independent variables were current and lagged values of GNP, government expenditure, and military expenditures. It was found that "a large proportion of variability in defense expenditures can be explained by economic variables: the overall constraint (GDP) and fiscal funding variables . . ."²⁸

The purpose of this paper is to extend Harris' work on Southeast Asia and our earlier work on Latin America. This paper examines how military spending patterns have been affected by stabilization and inflationary concerns (both expected and unexpected) in selected East Asian countries. The sample set consists of the five ASEAN countries studied by Harris (that is, Singapore, Indonesia, Thailand, Philippines, and Malaysia)

but also includes South Korea for comparative purposes. All economic data are drawn from the International Monetary Fund (IMF)²⁹ while defence expenditures are from the Stockholm Institute of Peace Research.³⁰ All data have been deflated by the IMF GDP deflator (1980=100) except that the IMF's CPI deflator was used in the case of Indonesia.³¹

The Models and Empirical Results

Three basic models were estimated using regression analysis to examine the effect of resource availability (both expected and unexpected) on military expenditures (MILEXP). Model I, the short-run stabilization model, and Model II, the short-run augmentation model, are as follows:

$$\text{MILEXP}_t = f(\text{EXGNP}_t, \text{UNEXGNP}_t)$$

where EXGNP is the expected level of GNP in time period t (based on the trend of past levels of actual GNP) and UNEXGNP is the unexpected GNP in the same period, and is defined as the difference between actual and expected GNP.

For both models the hypothesized sign of the estimated coefficient for EXGNP is positive. In other words, the military will share part of the expected increase in resource levels. This is the effect noted by Harris.³²

However, if the unexpected GNP level is rising in Model I type countries, military expenditures are used as a stabilization tool. MILEX will be decreased to offset the higher unexpected GNP and to dampen expected inflation. Thus, the expected sign of the coefficient will be negative. The opposite will hold true in Model II type countries. Countries which enjoy unexpected GNP increases treat them as "windfall gains" and concomitantly spend part of the gain on defence. Thus, the sign of the coefficient for UNEXGNP will be positive.

Model III is a long-run distributed lag model in the following form:³³

$$\text{MILEX}_t = f(\text{MILEX}_L, \text{EXGNP}_t, \text{UNEXGNP}_t)$$

where MILEX_L is the lagged value of MILEX. In this structural form, as EXGNP increases, for example, MILEX will increase immediately in the current time period but will positively affect MILEX in future time periods. In other words, the effect of increased resources availability is not a year-to-year reaction but is spread out and "decays" over time.

Country Results³⁴

The initial regression equation estimated for Singapore for the period 1965-85 is:³⁵

$$\text{MILEX} = .05 \text{ EXGNP} - .07 \text{ UNEXGNP}; \quad (1)$$

(13.67) (-2.22)

$$R^2 = .94; \quad F = 106.29; \quad DW = 1.91; \quad \beta = .24$$

These results indicate that defence spending patterns in Singapore conform to the stabilization model since UNEXGNP is negatively related to MILEX. In actuality, this means that policy-makers in Singapore are inclined to cut back military expenditures in response to increases in unexpected GNP. In other words, the amount of resources claimed by the military tends to decline during periods of unanticipated resource availability. Presumably, other activities, such as social and economic programmes, are the chief beneficiaries of any windfall resource gains. To confirm this, expected and unexpected deficits (EXDEF and UNEXDEF), and expected and unexpected inflation (EXINFL and UNEXINFL) were added to the model. The estimated equation is as follows:

$$\begin{aligned} \text{MILEX} = & .09 \text{ EXGNP} - .10 \text{ UNEXGNP} - .20 \text{ EXDEF} \\ & (6.30) \quad (-3.17) \quad (-2.41) \\ & - .14 \text{ UNEXDEF} - .69 \text{ EXINFL} - 1.4 \text{ UNEXINFL}; \quad (2) \\ & (-3.92) \quad (-1.41) \quad (-1.98) \end{aligned}$$

$$R^2 = .973; \quad P = 65.18; \quad DW = 1.74; \quad \beta = .41;$$

These results reinforce the stabilizing role that MILEX appear to play in Singapore. When the expected or unexpected surplus is declining (the deficit is increasing), defence budgets are reduced. Similarly, as inflation appears to be increasing, once again MILEX are reduced.

The results for Malaysia between 1960 and 1986 suggest the existence of a pure augmentation model along the lines suggested earlier by Harris. As equation (3) indicates, the sign of the estimated coefficient for EXGNP and UNEXGNP are both positive and statistically significant. Inflationary and budgetary expectations did not appear to affect defence budgets in Malaysia. Instead, the country appears content to allocate a relatively constant proportion of its resources to the military.

$$\text{MILEX} = .07 \text{ EXGNP} + .23 \text{ UNEXGNP}; \quad (3)$$

(4.43) (2.95)

$$R^2 = .56; \quad F = 13.19; \quad DW = 1.87; \quad \beta = .22;$$

The results for the Philippines indicate a blend of the short-run stabilization model and the long-run distributed lag model:

$$\begin{aligned} \text{MILEX} = & .35 \text{ MILEX}_L + .04 \text{ EXGNP} - .63 \text{ UNEXGNP} \\ & (1.90) \quad (3.18) \quad (-3.78) \\ & - .55 \text{ EXINFL} + .77 \text{ UNEXINFL} \quad (4) \\ & (-4.12) \quad (1.60) \end{aligned}$$

$$R^2 = .75; \quad F = 11.11; \quad DW = 1.69; \quad \beta = .69;$$

The Philippines exhibits a longer run expenditure adjustment pattern whereby the country gradually allocates resources to the military as the expected level of GNP increases. This is evidenced by the statistical significance of the lagged military expenditure term MILEX and the strong linkage with expected GNP (EXGNP). This picture should be qualified since short-run defence budgets are constrained by stabilization concerns. These take the form of reductions in defence allocations stemming from increases in expected inflation (EXINFL) or overheating of the economy (UNEXGNP).

The results for Thailand are reported as equation (5) and indicate a positive and statistically significant impact of the expected GNP level on defence expenditures in the same year.

$$\text{MILEX} = .68 \text{ EXGNP} - .26 \text{ UNEXGNP} \quad (5)$$

$$(13.57) \quad (-1.70)$$

$$R^2 = .91; \quad F = 95.85; \quad DW = 1.64; \quad \beta = .64;$$

There is, however, a weak stabilization effect on defence budgets indicated by the negative coefficient on the unexpected GNP variable.

The results for Korea suggest a long-term distributed lag model:

$$\begin{aligned} \text{MILEX} = & .75 \text{ MILEX}_L + .03 \text{ EXGNP} - .04 \text{ UNEXGNP} \\ & (3.64) \quad (2.08) \quad (-1.43) \\ & - .03 \text{ EXINFL} - .09 \text{ UNEXINFL}; \quad (6) \\ & (-1.09) \quad (-1.90) \end{aligned}$$

$$R^2 = .99; \quad F = 303.58; \quad DW = 1.94; \quad \beta = .28;$$

As the level of expected resources increases so does military expenditure but the effect is only felt over time. There are, however, three weak stabilizing effects which tend to ameliorate the resource enhancement effect as indicated by the negative signs for the estimated coefficients for UNEXGNP, and expected and unexpected inflation.

Indonesia appears to be a special case where the variability in military expenditures from year to year can be explained by changes in crude petroleum production in the previous year (OIL_L) and expectations about the budget surplus. The estimated equation is as follows:

$$\begin{aligned}
 \text{MILEX} = & \underset{(3.53)}{1.70 \text{ OIL}_L} + \underset{(3.26)}{.29 \text{ EXDEF}} \\
 & - \underset{(-2.06)}{.33 \text{ EXINFL}} - \underset{(1.98)}{.27 \text{ UNEXINFL}} \quad (7)
 \end{aligned}$$

$$R^2 = .75; \quad F = 7.52; \quad DW = 2.19; \quad \beta = .58;$$

For the most part, the data for Indonesia indicate a pure augmentation approach. As either the petroleum output for the previous year or expected surplus increases, military spending increases. There is, however, a minor stabilizing effect: fears about expected and unexpected inflation tend to reduce MILEX.

Summary and Conclusions

Historically, conventional wisdom has assumed that political/strategic factors dominate year-to-year variations in Third World country military expenditures. Recent empirical studies, however, have suggested that economic variables may play an important, if not dominant, role in structuring budgetary allocations to the military. Harris' work on Southeast Asia indicated that this was likely to be the case for the major developing countries in the region.

The findings presented above support Harris' contention that economic variables and resource availability are more than likely the main determinants of military expenditures. In extending his work, this paper has attempted to see if there is any uniformity in how individual countries spend extra resources.

The results indicate three basic patterns: stabilization (Singapore), augmentation (Malaysia), and distributed lags (Philippines). All countries increased defence budgets as expected GNP increased. There were, however, significant variations between countries as to the timing of increased defence allocations. Specifically, Thailand exhibited a weak stabilization pattern. Korean defence expenditure patterns followed the long-run distributed lag function although as in the case of Thailand there was a weak stabilization effect. Indonesia was found to be a special case where resource availability was measured by crude oil production. However, there was a weak augmentation effect as measured by the expected and unexpected rate of inflation.

In an earlier paper examining Latin America, it was found that while economic constraints explained a large proportion of the variation of individual country allocations to defence, great diversity existed as to the manner in which these factors shaped the actual pattern of defence

allocations over time. These variations were so pronounced that it was impossible to form specific *a priori* generalizations about the manner in which economic constraints control the budgetary process in developing countries. This paper has confirmed that the same general conclusion holds true for selected countries in East Asia.

NOTES

* We would like to thank Dr Andrew Ross for valuable comments on this paper.

1. United States Arms Control and Disarmament Agency (USACDA), *World Military Expenditures and Arms Transfers 1988* (Washington, D.C.: Government Printing Office, 1989), p. 1.
2. *Ibid.*, p. iii.
3. ACDA's East Asia category includes Japan which is not a developing country.
4. These are only two of many possible measures of "militarization". For a full discussion of these measures, see Andrew L. Ross, "Dimensions of Militarization in the Third World", *Armed Forces and Society* 13, no. 4 (Summer 1987): 561-79.
5. K.W. Rothschild, "Military Expenditure, Exports and Growth", *Kyklos* 26, no. 4: 804-14.
6. Emile Benoit, *Defense and Economic Growth in Developing Countries* (Boston: D.C. Heath and Co., 1973). See also Emile Benoit, "Growth and Defense in Developing Countries", *Economic Development and Cultural Change* 26, no. 2 (January 1978): 271-80.
7. For an excellent review of the literature, see Steve Chan, "The Impact of Defense Spending on Economic Performance: A Survey of Evidence and Problems", *Orbis* 29, no. 3 (Summer 1985): 403-34.
8. See, for example, Wayne Joerding, "Economic Growth and Defense Spending: Granger Causality", *Journal of Development Economics* 21 (1986): 35-40. See also P.C. Frederiksen, "The Relationship between Defence Spending and Economic Growth: Some Evidence for Indonesia, 1964-85", *Contemporary Southeast Asia* 10, no. 4 (March 1989): 375-84; and C.J. LaCivita and P.C. Frederiksen, "Defense Spending and Economic Growth: An Alternative Approach to the Causality Issue", *Journal of Development Economics* (forthcoming).
9. Saadat Deger and Robert West, eds., *Defence, Security and Development* (London: Frances Pinter, 1987), p. xi.
10. For a general survey of the literature, see Nicole Ball, *Security and Economy in the Third World* (Princeton: Princeton University Press, 1988), chapters 2 and 3. Ball raises the legitimate question of the reliability of military expenditure data in the developing world. Obviously, for a number of reasons countries might be inclined to bias their reported data on military expenditures. This factor often makes cross-sectional comparisons of military expenditures difficult. However, for the time series analysis attempted in this paper, it is probably safe to assume that the same error in the reported data occurs each year and would "wash out" over time.
11. *Ibid.*, p. xii.
12. L.J. Griffin, M. Wallace, and J. Devine, "The Political Economy of Military Spending: Evidence from the United States", *Cambridge Journal of Economics* 6, no. 1

- (1982): 1-14. For a more recent analysis, see Robert E. Looney, "Determinants of United States Defense Expenditures", *American Journal of Economics and Sociology* (forthcoming, 1990).
13. John M. Treddenick, "The Arms Race and Military Keynesianism", *Canadian Public Policy* 11, no. 1 (1985): 78.
 14. *Ibid.*, p. 77.
 15. Kim Quaile Hill, "Domestic Politics, International Linkages, and Military Expenditures", *Studies in Comparative International Development* 13, no. 1 (Spring 1978): 38-59. This article provides an excellent review of the literature prior to 1978.
 16. *Ibid.*, p. 53.
 17. Arthur H. Westing, "Military Expenditures and their Reduction", *Bulletin of Peace Proposals* 9, no. 1 (1978): 24-29.
 18. *Ibid.*, p. 26.
 19. Barry Ames and Ed Goff, "Education and Defense Expenditures in Latin America: 1948-68", in *Comparative Public Policy: Issues, Theories and Methods*, edited by Craig Liske, William Loehr, and John McCamant (New York: John Wiley and Sons, 1975).
 20. Michael K. O'Leary and William Coplin, *Quantitative Techniques in Foreign Policy Analysis and Forecasting* (New York: Praeger, 1975).
 21. Alfred Maizels and Machiko K. Nissanke, "The Determinants of Military Expenditures in Developing Countries", *World Development* 14, no. 9 (1986): 1125-40. See also Alfred Maizels and Machiko Nissanke, "The Causes of Military Expenditure in Developing Countries", in *Defence, Security and Development*, edited by Deger and West, pp. 129-39.
 22. Maizels and Nissanke, "The Determinants of Military Expenditures in Developing Countries", p. 1137.
 23. Geoffrey Harris, "The Determinants of Defence Expenditure in the ASEAN Region", *Journal of Peace Research* 23, no. 1 (1986): 41-49.
 24. *Ibid.*, p. 46. For an excellent survey article, see G.T. Harris, "Economic Aspects of Military Expenditure in Developing Countries: A Survey Article", *Contemporary Southeast Asia* 10, no. 1 (June 1988): 82-102.
 25. David B.H. Denoon, "Defence Spending in ASEAN: An Overview", in *Defence Spending in Southeast Asia*, edited by Chin Kin Wah (Singapore: Institute of Southeast Asian Studies, 1987), pp. 48-71.
 26. *Ibid.*, p. 57.
 27. Robert E. Looney and Peter C. Frederiksen, "Economic Determinants of Latin American Defense Expenditures", *Armed Forces and Society* 14, no. 3 (Spring 1988): 459-71.
 28. *Ibid.*, p. 468.
 29. International Monetary Fund, *International Financial Statistics: 1988 Yearbook* (Washington D.C.: International Monetary Fund, 1989).
 30. Stockholm International Peace Research Institute, *SIPRI Yearbook* (Stockholm: Stockholm International Peace Research Institute), various issues. The data used were drawn from SIPRI rather than from ACDA since longer time series were available from the former for most countries.
 31. Since such a large proportion of Indonesia's GDP is from oil revenues, the GDP deflator was not considered a good measure of military expenditure inflation.
 32. See Harris, "The Determinants of Defence Expenditure".
 33. For a discussion of distributed lag equations, see Potluri Rao and Roger Miller, *Applied Econometrics* (Belmont, California, 1971), p. 165.
 34. The three basic models were run for every country in the sample. Only the most

significant results appear in this paper. A copy of all the regression results can be obtained from the authors on request.

35. The reported coefficients have all been standardized. The t-statistic appears in parentheses under the estimated coefficient.

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